



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/729,582	12/06/2003	Benjamin Jian	AFC-002/RE	2222
27652	7590	12/31/2007		
JOSHUA D. ISENBERG JDI PATENT 809 CORPORATE WAY FREMONT, CA 94539			EXAMINER PAK, SUNG H	
			ART UNIT 2874	PAPER NUMBER
			MAIL DATE 12/31/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/729,582	JIAN, BENJAMIN	
	Examiner	Art Unit	
	Sung H. Pak	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36,39,41 and 42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-36,39,41 and 42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicant's amendment filed 6/26/2007 has been entered. All pending claims have been carefully reconsidered in view of the amendment.

Reissue Applications

Claims 30-36, 39 and 41 are rejected under 35 U.S.C. 251 as being an improper recapture of broadened claimed subject matter surrendered in the application for the patent upon which the present reissue is based. See *Pannu v. Storz Instruments Inc.*, 258 F.3d 1366, 59 USPQ2d 1597 (Fed. Cir. 2001); *Hester Industries, Inc. v. Stein, Inc.*, 142 F.3d 1472, 46 USPQ2d 1641 (Fed. Cir. 1998); *In re Clement*, 131 F.3d 1464, 45 USPQ2d 1161 (Fed. Cir. 1997); *Ball Corp. v. United States*, 729 F.2d 1429, 1436, 221 USPQ 289, 295 (Fed. Cir. 1984). A broadening aspect is present in the reissue which was not present in the application for patent. The record of the application for the patent shows that the broadening aspect (in the reissue) relates to claim subject matter that applicant previously surrendered during the prosecution of the application. Accordingly, the narrow scope of the claims in the patent was not an error within the meaning of 35 U.S.C. 251, and the broader scope of claim subject matter surrendered in the application for the patent cannot be recaptured by the filing of the present reissue application.

During the prosecution of the parent patent application, the following limitations were in dependent claims and incorporated into a previously rejected independent claim to make the noted patent claims allowable:

Concerning the apparatus claims:

A) “wherein said second layer has an index of refraction substantially equal to the index of refraction of the core of said optical fiber” (patent claim 1);

B) “an epoxy that fills the gap between the end face of the optical fiber and the adjacent portion of the second layer, said epoxy having an index of refraction approximately matches the index of the optical fiber so that optical losses are reduced” (patent claim 6);

C) “an optical device integrated into said second layer” (patent claim 7);

D) “wherein said optical focusing element comprises a gradient-index lens” (patent claim 10);

E) “wherein said optical focusing element comprises a diffractive lens” (patent claim 13);

F) “a third layer bonded to said second layer, said third layer comprising an optical device” (patent claim 14).

Concerning the method claims:

G) “forming a plurality of VCSELs in said second layer in a predetermined configuration corresponding to the configuration of said fiber sockets; and aligning said first layer with said second layer so that said VCSELs are aligned with said fiber sockets, and then performing said step of bonding said first and second layers together to provide said composite wafer” (patent claim 18);

H) “forming a plurality of photodetectors in said second layer in a predetermined configuration corresponding to the configuration of said fiber sockets; and aligning said first layer with said second layer so that said photodetectors are aligned with fiber sockets, and then

performing said step of bonding said first and second layers together to provide said composite wafer” (patent claim 19);

I) the last two paragraphs of patent claim 20;

J) the last paragraph of patent claim 21;

K) the last paragraph of patent claim 22;

L) the last paragraph of patent claim 23;

M) the last paragraph of patent claim 24;

N) the last paragraph of patent claim 25;

O) the last paragraph of patent claim 26;

P) the last paragraph of patent claim 27;

Q) the last paragraph of patent claim 28; and

R) “bonding a third layer that comprises an optical device to said second layer” (the last paragraph of patent claim 29).

Thus, the above limitations are “surrender generating limitations.” (see MPEP section 1412.02(I)(C)(2)). Given that the new claims 30-36, 39 and 41 totally omit all of the given “surrender generating limitations” and that the addition of “substantially cylindrical” fiber socket(s) narrows the scope of the apparatus patent claims and that the addition of “deep reactive ion” etching narrows the scope of the method patent claims in areas not directed to the surrender generating limitations, these claims fall under MPEP section 1412.02(I)(C)(2)(a) which indicates that these type of claims are barred by the recapture rule. In order to avoid recapture, the new apparatus claims would have to include at least a broadened version of at least one of the above

apparatus limitations and the new method claims would have to include at least a broadened version of at least one of the above method limitations (see MPEP section 1412.02(I)(C)(2)(d)).

Exception to the recapture rule discussed in the footnote of *In re Clement* does not apply to the instant application, because in the continuing application (09/995,214) of the parent application (09/327,826), the independent apparatus claim did not issue as originally filed. The changes in the independent claim was that (1) instead of one multilayer optical fiber coupler the issued patent of the continuing application claimed a multilayer stack that has a plurality of optical fiber couplers and (2) both the optical fiber and the fiber socket were pluralized.

The reissue oath/declaration filed with this application is defective because the error which is relied upon to support the reissue application is not an error upon which a reissue can be based. See 37 CFR 1.175(a)(1) and MPEP § 1414.

Claims 1-36, 39 and 41-42 are rejected as being based upon a defective reissue declaration under 35 U.S.C. 251 as set forth above. See 37 CFR 1.175.

The declaration filed on 6/26/07 in its error statement indicates that “bonding a third layer that comprises an optical device to said second layer” in patent claim 29 is unnecessary for patentability. Since this limitation was necessary for the patentability of claim 29 (see the discussion above, especially item “R”), the cited error is not an appropriate error upon which a reissue can be based.

Allowable Subject Matter

Claims 18-29, 34-36, 39 contain allowable subject matter.

These claims contain allowable subject matter discussed in the previous office action, supplemented by the applicant's reply dated 6/26/2007.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 7-9, and 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda (US 5,434,939) in view of Kravitz et al (US 5,659,647).

Matsuda discloses a first layer (203) having a socket (216) extending through the first layer and one or more fiber socket sized to receive and align an optical fiber (Fig. 2); wherein one or more fiber socket include two or more sockets (Fig. 3c); wherein a second layer is affixed to the first layer (Fig. 2); said optical fiber having an end section that extends through the fiber socket (Fig. 2); said optical fiber terminating at the end face situated approximately adjacent to

the second layer (Fig. 2); said fiber socket aligning and positioning said optical fiber therein (Fig. 2); and a VCSEL device (204, 205, Fig. 2) integrated into said second layer.

However, Matsuda does not explicitly teach that the fiber socket is cylindrical.

Nonetheless, the use of cylindrical fiber socket for holding optical fibers is wide-spread and well-recognized in the art, for example, as shown by Kravitz ('44' in Fig. 3; column 3 lines 58-67). Kravitz discloses that such fiber sockets may be manufactured by etching (column 3 lines 58-67). Cylindrical fiber sockets formed by etching, such as dry etching, are advantageously used in the art because cylindrical fiber sockets have larger surface contacts with the disposed optical fibers compared to tapered fiber sockets, and therefore they are able to more securely hold optical fibers. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device of Matsuda to have cylindrical fiber socket as taught by Kravitz.

Claims 1-6, 10-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Konishi et al (JP 06-138341).

Regarding claim 1, Konishi discloses an optical coupler comprising: a first layer (5, silicon guide plate), said first layer defining a fiber socket (16); said fiber socket sized to receive and align said optical fiber therein (see [0014]); a second layer (11, transparent substrate) bonded to said first layer (see [0015]); said optical fiber having an end section that extends through the fiber socket, said optical fiber terminating at an end face situated approximately adjacent to the second layer and said fiber socket aligning and positioning said optical fiber therein (Fig. 1). Konishi also discloses that the second layer is transparent substrate.

However, Konishi does not specifically teach that the second layer has the refractive index that is substantially equal to the refraction index of the optical core. When coupling optical beam between an optical fiber and optical element, using a material having refractive index that is substantially equal to the refractive index of the optical core would provide the efficient optical coupling without spreading light beam between the optical fiber and the optical element.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the second layer with the refractive index that is substantially equal to the optical fiber core in Konishi et al in order to improve the optical coupling efficiency.

Further, Konishi does not explicitly teach that the fiber socket is cylindrical. Nonetheless, the use of cylindrical fiber socket for holding optical fibers is wide-spread and well-recognized in the art, for example, as shown by Kravitz ('44' in Fig. 3; column 3 lines 58-67). Kravitz discloses that such fiber sockets may be manufactured by etching (column 3 lines 58-67). Cylindrical fiber sockets formed by etching, such as dry etching, are advantageously used in the art because cylindrical fiber sockets have larger surface contacts with the disposed optical fibers compared to tapered fiber sockets, and therefore they are able to more securely hold optical fibers. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device of Konishi to have cylindrical fiber socket as taught by Kravitz.

Regarding claim 2, Konishi does not explicitly state that the optical fiber is a single mode fiber. Using a single mode optical fiber is well known in the art. Since Konishi teaches making

the socket almost equal to the outer diameter of the optical fiber and not specify the types of optical fibers, using any type of optical fiber including a single mode optical fiber would have been obvious to one having ordinary skill in the art.

Regarding claim 3, Konishi discloses that the first layer is a single-crystal silicon layer (see [0009]). Regarding claims 4 and 5, Konishi does not teach that the second layer comprises silicon or glass. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use either a silicon or glass for the second layer in Konishi et al, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

Regarding claim 6, Konishi et al teach fitting and adhering the optical fiber in the socket formed in the first layer and pasting the first layer to the second layer. This arrangement provides an epoxy between the optical fiber (first layer) and the second layer. Using the epoxy having an index of refraction that matches the index of the optical fiber in Konishi et al would have been obvious to one having ordinary skill in the art to provide the efficient optical coupling.

Regarding claim 7, as described above Konishi et al teach all the claimed limitations including an optical device (12) integrated into the second layer. Regarding claims 10 and 11, as described above Konishi et al teach the claimed limitations including optical focusing element (12) having focal points approximately situated along the central axes of the fiber socket (see Fig. 1). However, Konishi et al do not teach that the focusing element is a gradient-index lens. A gradient-index lens is commonly used in the art to focus the light beam. Thus, using a gradient-index lens in Konishi et al would have been obvious to one having ordinary skill in the art at the time the invention was made to focus the light.

Regarding claim 12, Konishi et al do not specific teach that the optical fiber is a single mode fiber. Using a single mode optical fiber is well known in the art. Since Konishi et al teach making the socket almost equal to the outer diameter of the optical fiber and not specify the types of optical fibers, using any type of optical fiber including a single mode optical fiber would have been obvious to one having ordinary skill in the art.

Regarding claim 13, Konishi et al show a diffractive lens (12, see Fig. 1). Regarding claims 14-17, as described above, Konishi et al teach all the claimed limitations except a third layer bonded to the second layer wherein the third layer comprising an optical device such as a VCSEL or focusing element. Since Konishi et al teaches further coupling of a semiconductor laser (1) and a focusing element (2), using additional layer to accommodate optical device such as VCSEL or lenses in Konishi et al would have been obvious to one having ordinary skill in the art at the time the invention was made to make the device more compact and easier to align.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sung H. Pak whose telephone number is (571) 272-2353. The examiner can normally be reached on Monday- Friday, 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571)272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Application/Control Number:
10/729,582
Art Unit: 2874

Page 11

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sung Pak/
Sung H. Pak
Primary Patent Examiner
Art Unit 2874